

UROSKOP Access

SP

Adjustment

System

ASPIA Imaging System

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Document revision level

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1	Prerequisites	5
	General information	5
	Notes	5
	Safety information	5
	Abbreviations	7
	Product-specific notes	8
	Required documents	8
	Lubrication points	8
	Required aids and tools	8
	Replacement of mechanical parts and adjustments	9
	Corrective measures / settings	9
	Contents of the service and system software	9
	Image quality	10
	Covers	10
	Testing the protective ground wire	11
2	Settings and Function Tests	12
	Setting the central ray	12
	Vertically aligning the X-ray tube central ray	12
	Aligning the central ray to the I.I.	12
	Checking the coincidence of the radiation field center with the film center	14
	Checking the FL field limitation (collimation)	17
	Checking the cassette	19
	1. Collimator: Direct technique collimation, overframing on film	19
	2.1 Light field / radiation field with centering cross	20
	2.2 Light field / radiation field without centering cross	22
	PDA adjustment	24
	Dose and PDA adjustment	26
	Adjusted mA value during dose setup	26
	PDA check	27
	Setting the TV iris diaphragm	29
	Min/max setting	29
	Adjusting the image brightness (step 1)	29
	Setting the grey filter transfer value (step 2)	31
	Iris attenuation	32
	Zoom / Iris correction	32
	Brightness correction for DR and PFL	34
	Checking the dose rate	36
	Water equivalent adjustment	39
3	Mechanical Calibration	40
	Prerequisites	40
	Movement of drives with service keys S1/S2	40
	Zero adjustment method	43
	Calibration of lift drive	44
	Prerequisites	44

Adjustment.	44
Check	45
Calibration of tilt drive (+/- 90°)	46
Prerequisites	46
Adjustment.	46
Check	47
Calibration of tilt drive (limitation of +90° position)	48
Prerequisites	48
Check	48
Calibration of tilt drive (limitation of -90° position)	49
Prerequisites	49
Check	49
Calibration of exposure system.	50
Prerequisites	50
Adjustment.	50
Check - max. head end	51
Check - max. foot end	51
Final check	51
Calibration of tabletop, longitudinal	52
Prerequisites	52
Adjustment.	52
Check	53
Calibration of tabletop, transverse	54
Prerequisites	54
Adjustment.	54
Check	55
Calibration of tube parking drive, speed	56
Check	56
Calibration of cassette drive	57
Prerequisites	57
Adjustment.	58
Check	59
Calibration of cassette, load speed	60
Adjustment.	60
Collimator, speed of plates	62
Adjustment.	62
Check	62
Collimator, switch-on time light localizer lamp	63
Adjustment.	63
Check	63
Room dimensions	64
Ceiling height/distance from floor to I. I.	64
Checking the distance from floor to I. I.	66
Checking the tabletop movement to ceiling height	66
Checking the tabletop movement footward	67

4 Changes to Previous Version 68


General information

Notes



NOTE	Depending on the system version, the illustrations and drawings may deviate slightly from the system supplied.
NOTE	The names of menu items on screens can differ depending on the user language selected (regional settings). The menus mentioned in this document are based on the English language.



Safety information

General safety information

 WARNING	<p>Danger of property damage, injury, death!</p> <p>Non-observance can lead to property damage, injury or death.</p> <ul style="list-style-type: none"> ⇒ Observe the general safety instructions in this document, in the document “Medical Products; Safety Information; System“ (TD00-000.860.01.xx) and the safety instructions according to ARTD part 2.
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General safety information - electrical

	 WARNING	<p>Electrical safety!</p> <p>Non-observance can lead to property damage, serious injury or death.</p> <ul style="list-style-type: none"> ⇒ After the covers are opened, parts under voltage are exposed. To avoid hazards, the system has to be disconnected from the power line prior to opening the covers. ⇒ If work is required while voltage is live, the general safety instructions according to document “Medical Products; Safety Information; System“ (TD00-000.860.01.xx) have to be observed.
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	 CAUTION	<p>Live parts!</p> <p>Non-observance can lead to property damage.</p> <ul style="list-style-type: none"> ⇒ Observe the ESD guidelines for working on the system.
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Safety information - radiation

**WARNING****Radiation!**

Non-observance can lead to illness, irreversible damage to body cells and genetic structure, or death.

- ⇒ During work on the system that necessitates the release of radiation, the safety and radiation protection guidelines pursuant to ARTD part 2 (ARTD-002.731.02) must be observed.
- ⇒ Ensure that all available radiation protection devices are used, that radiation protection clothes are worn, that the distance to the source of radiation is as large as possible, that radiation is only released if necessary, and that the set-up values are as low as possible (low kV and mA values, short switch-on time).

Safety information - mechanical**CAUTION****Danger of burns from hot parts or components!**

Non-observance can lead to minor or moderate burns, especially to the hands. After cover panels are opened, components (especially cooling elements and high-performance parts) that can reach temperatures > 50°C are exposed.

- ⇒ To prevent burns caused by touching parts and components, the system must be switched off and allowed to cool down for at least 5 minutes.

CAUTION**Danger of injuries from mechanical parts!**

Non-observance can lead to minor to moderate injuries, especially to the hands. After covers are opened, parts like plugs, threaded bolts, shortened cable fixtures and edges of components can be accidentally touched, possibly resulting in contusions, abrasions and cuts of the skin.

- ⇒ Carry out such work with special caution.
- ⇒ Wear suitable protective gloves.

Safety information - risk of infection

⚠ CAUTION

Risk of infection from bacteria/viruses!

Non-observance can lead to severe injuries and even death.

- ⇒ This product can be contaminated by infected blood or other body fluids.
- ⇒ Avoid all contact with blood or other body fluids.
- ⇒ Strictly observe the safety information in ARTD part 2 (ARTD-002.731.37) regarding prevention of infectious diseases during customer service calls.

Abbreviations

DR	Exposure
EP	Exposure points
ESD	Electrostatically-sensitive device
f	Frame
FL	Fluoroscopy
FW	Firmware
I.I.	Image intensifier
IQ	Image quality
LED	Light emitting diode
LIH	Last image hold
PDA	Photo diode array
PFL	Pulsed fluoroscopy
SS	Service switch
SSW	Service software
SW	Software

Product-specific notes

Required documents

ARTD "Prophylactic Measures against Infectious Diseases during Service"	ARTD part 2 (ARTD-002.731.37)
ARTD "Radiation Protection RD and CT"	ARTD part 2 (ARTD-002.731.02)
ARTD "Safety and Radiation Protection Guidelines"	ARTD part 2
ARTD "Service PC and Service Software"	ARTD part 1 (ARTD-001.719.06)
Installation Instructions; System	SPL5-330.812.01.xx
Medical Products; Safety Information; System	TD00-000.860.01.xx
Quality Assurance; System; Image Quality Quick Test	SPL5-330.820.01.xx
Replacement of Parts; System; Basic Unit and Imaging System	SPL5-330.841.01.xx

Lubrication points

NOTE

Before performing any adjustments, check the condition of all accessible chains and spur gears, sliding and rolling guides and, if necessary, lubricate them with Longtime PD 2 (unless otherwise stated).

Required aids and tools

NOTE

All tools, measuring and auxiliary devices with the exception of the standard installation tools are listed in the Service Tools Catalogue (part of the Spare Part Catalogue).

Centering cross	96 60 051 RE999
cm scale	n.a.
ESD equipment type 8501 - 3M	97 02 606 Y3121
Ground wire tester ¹	44 15 899 RV090
Loctite 221 (for threaded connectors)	20 48 874

Longtime PD2 (tube 20 g) (pressure lubricant for long-term lubrication of bearing cages, open ball bearings, chains, cables, etc.)	34 91 271
PTW DIADOS	97 17 612 KE999
Safety Tester Unimet 1100 ²	51 38 727 Y0766
Service cable (5 m)	99 00 440 RE999
Service PC as specified in ARTD-001.719.06	n. a.
Spirit level	n. a.

1. The safety tester Unimet 1100 can be used as replacement for this measuring equipment.
2. This universal test meter can be used for testing the electrical safety of medical equipment per DIN VDE 0751 and EN 60601.

Replacement of mechanical parts and adjustments

NOTE

After the replacement/adjustment of mechanical components, a function test must be performed.

Detailed information is given in the corresponding sections of document "Replacement of Parts; System; Basic Unit and Imaging System" (SPL5-330.841.01.xx), in the XCS SSW or the UROSKOP Access SSW.

Corrective measures / settings

NOTE

In several places in the document, reference is made to the XCS SSW for corrective measures and settings.

- Select **Components > Urooskop** in the XCS SSW and subsequently **Adjustment**.

Contents of the service and system software

NOTE

Using the compatibility list included in the shipment, check the compatibility of the SCU (XCS), System SW, SSW and FW versions.

- Connect the PC to the XCU with the service cable.
- Start the XCS SSW.
- Select **Info**.

Image quality

NOTE

After any replacement or adjustment of image chain components, an image quality test in accordance with the document “Quality Assurance; System; Image Quality Quick Test” (SPL5-330.820.01.xx) must be performed.

In addition, the tests required under the regulations of the relevant country (e. g. USA [DHHS], Germany [§ 16 X-ray Ordinance]) must be carried out.

Covers

NOTE

Detailed information for removing and attaching the covers can be found in document “Installation Instructions; System” (SPL5-330.812.01.xx).

Make sure that the cover screws have the correct length. Otherwise there is a risk of damage.

To remove the covers, it is sometimes necessary to move the unit, especially the tabletop. To remove the covers, simply engage the **EMERGENCY STOP** of the unit on the table or on the lifting base. Release the **EMERGENCY STOP** when movement is required.

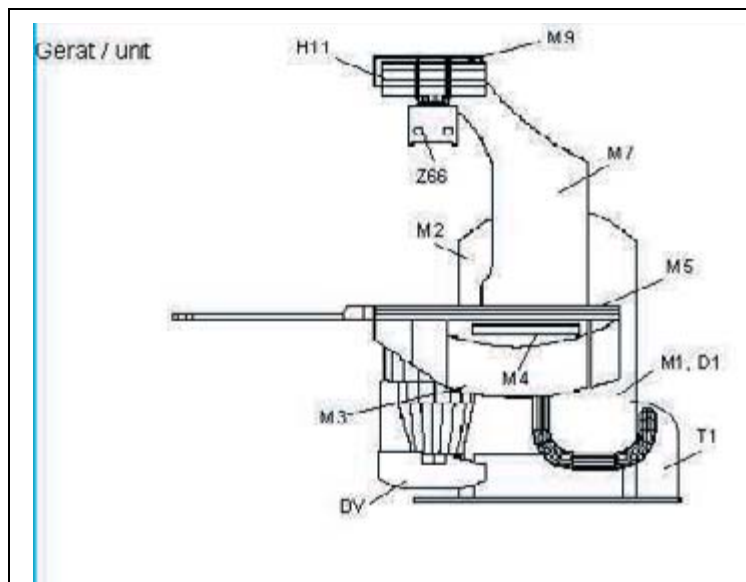


Fig. 1: Components

The locations of the UROSKOP Access components are shown in (Fig. 1 / p. 10).

- After the removal/attachment of the I. I. protective cover, perform a function check of the collision protection switches.
- The unit cover (M7) must be inserted laterally. Watch the cover of the tube support arm to prevent it from being scratched.
- All rubber seals must be properly in place on the covers.

Testing the protective ground wire

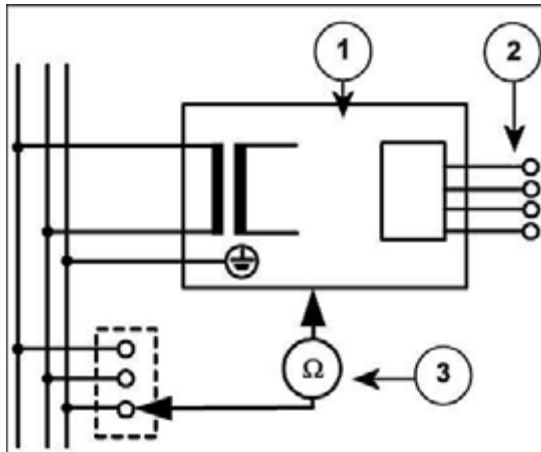


Fig. 2: Measuring circuit for measuring the ground wire resistance in systems that are permanently connected to the power supply net (per DIN VDE 0751-1:2001-10, Fig. C3).

- Pos. 1 System
 Pos. 2 Type B Applied Part
 Pos. 3 Measurement Setup (integrated into test meter)

- The protective ground wire test must be performed after every intervention in the system, i. e. if parts/components that can significantly influence the protective ground wire resistance are replaced (e. g. changes to the on-site electrical system, change in the setup location, expansion of the system, replacement of the power-up module, replacement of multi-pole connection cables, which also create the protective conductor connection between system parts) or if protective conductor connections have been repaired, evaluated and documented.
- Perform the ground wire test according DIN VDE 0751, part 1 (ARTD, part 2). Ensure that the system is completely installed, all covers are attached and all ground wire connections have been made. Test the protective ground wire resistance between the protective conductor bar for the entire system and any accessible, conductive part of the product during the normal operating state of the system.

The protective ground wire resistance may not exceed 0.2 Ω .

NOTE

For evaluation purposes, the first measured value and the values documented during maintenance or safety checks must be compared to the measured values. A sudden or unexpected increase in the measured values may indicate a defect in the protective conductor connections - even if the limit value of 0.2 Ω is not exceeded.

NOTE

Ensure that control or data cabling does not affect ground wire connections.

Setting the central ray

Vertically aligning the X-ray tube central ray

Prerequisites

- The tube carriage cover must be removed.
- The collimator must be removed.
- Check the image acquisition system (tube assembly, I. I.) with a spirit level.
 - ⇒ The image acquisition system must be in the 0° position, vertical to the table.
- Check the tabletop with a spirit level close to the column.
 - ⇒ The table must be horizontal.

Adjustment



Fig. 3: Central ray

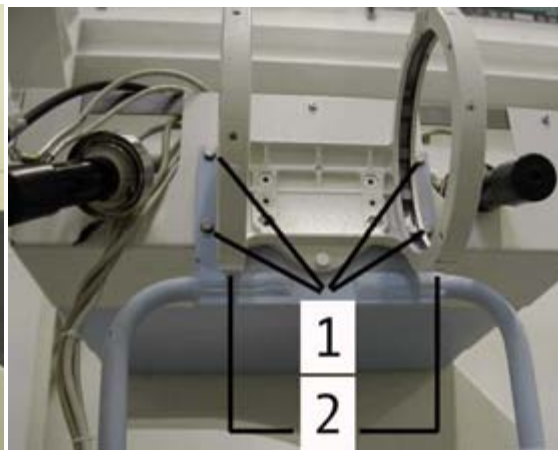


Fig. 4: Central ray

- Using the spirit level, align the **tube housing flange**, see (Fig. 3 / p. 12), horizontally in the transverse and longitudinal direction.
 - Longitudinal direction: the tube assembly can be adjusted by unscrewing the 4 Allen screws of the tube assembly holder (1/Fig. 4 / p. 12).
 - Transverse direction: by unscrewing the two Allen screws from the holders of the tube assembly housing (2/Fig. 4 / p. 12).

Evaluation

- ⇒ After the adjustment and attachment, check the tube housing flange again to make sure that it is horizontal in all directions.

Aligning the central ray to the I.I.

Prerequisites

NOTE

The vertical alignment of the central ray ([Vertically aligning the X-ray tube central ray / p. 12](#)) must be performed prior to this adjustment.

- The collimator must be mounted on the flange and all cables must be connected.
- The tabletop is not in the radiation area (end position).
- The protective cover of the I.I. has been removed.
- The I.I. grid has been removed (mark the location of the grid before removing it).
- The center of the I.I. is marked with crosshairs.
- The tube assembly is in the exposure position.
- Continuous fluoroscopy must be selected.

**Adjustment**

- Briefly release FL.
- Evaluate the stored image in LIH.

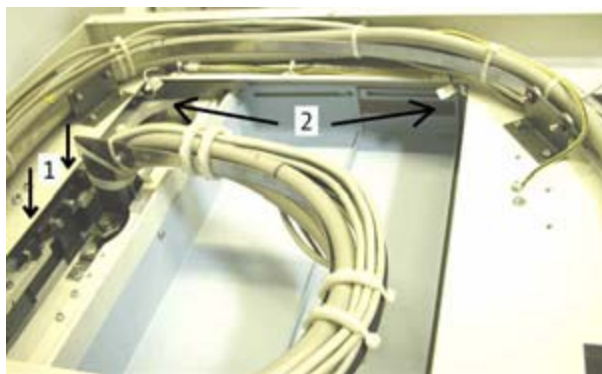


Fig. 5: Central ray

NOTE

In the exposure position, the tube assembly transverse carriage must always be at stop. The exposure position switch must be positively actuated (< 2 mm tracking).

- In the longitudinal direction:
 - Close the collimator and open the width diaphragm.
 - Adjust the tube assembly with the two adjustment screws, see ([1/Fig. 5 / p. 13](#)) on the longitudinal carriage so that the center of the cross is visible on the monitor centrally between the collimator leaves in the longitudinal direction. Then attach the tube assembly housing.

Evaluation

Deviation ≤ 2 mm

- In the transverse direction:
 - Close the collimator, then open the height diaphragm.
 - Adjust the tube assembly with the exposure position switch, see (2/Fig. 5 / p. 13) (arrows 2 for exposure position switch S122 and park position switch S123), so that the center of the cross is visible on the monitor centrally between the collimator leaves in the transverse direction. The transverse carriage will hit the stop only lightly.

Evaluation

Deviation ≤ 2 mm

Checking the coincidence of the radiation field center with the film center

Prerequisites

NOTE

The alignment of the central ray to the I. I. (Aligning the central ray to the I.I. / p. 12) must be performed prior to this adjustment.

- Cassettes without intensifying screens are available.
- Move the tube assembly and I. I. into the exposure position.
- Remove all Cu filters (if inserted in the collimator).
- Move the unit to the 0° position.

Check

- Select a cassette program at the imaging system and select **70 kV, 320 mAs**.
- Place a cassette with a center and side marker with film into the cassette tray.
 - ⇒ The side marker should be located approx. 3 cm below the center diagonally.

3 exposures must be taken on **one** film:

- 1st exposure:



- Unit at 0°, set collimator opening approx. 10 x 10 cm under FL.
- Release DR.
- Insert the cassette once again by moving the tray out/in.

- 2nd exposure:



- Unit in +90° head up position, set collimator opening approx. 15 x 15 cm under FL.
- Release DR.
- Insert the cassette once again by moving the tray out/in.

- 3rd exposure:



- Unit in -90° Trendelenburg position, set collimator opening approx. 20 x 20 cm under FL.
- Release DR.
- Remove the cassette.

- Process the film and note the exposure date and exposure data on it.

Evaluation

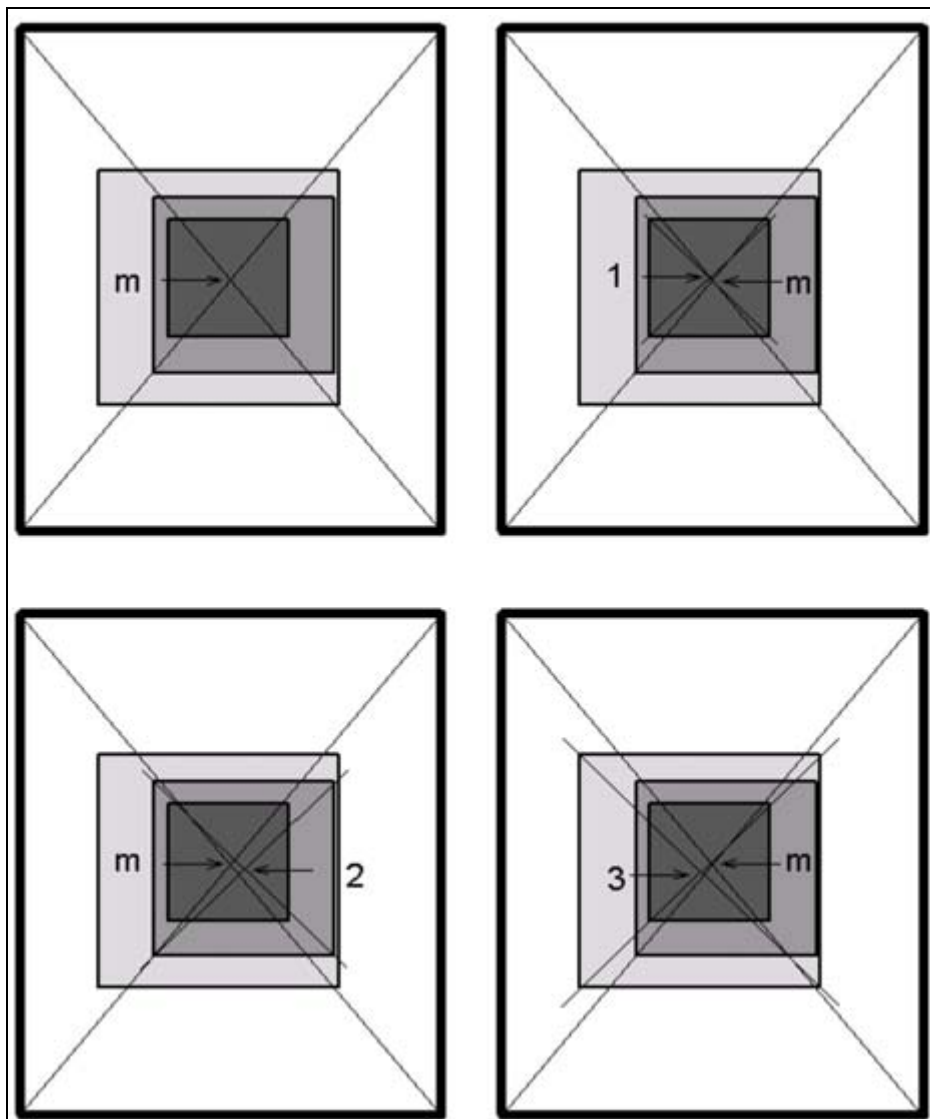


Fig. 6: Cassette central ray

- In each case, draw these diagonals on the film (Fig. 6 / p. 15):
 Diagonal m => film center
 Diagonal 1 => 0° position (10 cm x 10 cm)
 Diagonal 2 => +90° position head up (15 cm x 15 cm)
 Diagonal 3 => -90° position "Trendelenburg" (20 cm x 20 cm)
- Measure the distances (center deviation) from the center of the film (m) to the central ray centers (1; 2; 3).

Evaluation

Max. permissible deviations:

For 10 cm x 10 cm collimation	Center deviation $m \leq 7 \text{ mm}$
For 15 cm x 15 cm/20 cm x 20 cm collimation	<div> $\text{Center deviation} = \frac{m}{115 \text{ cm}} \times 100 \leq 1.2\%$ </div> <div>Fig. 7:</div>

Checking the FL field limitation (collimation)

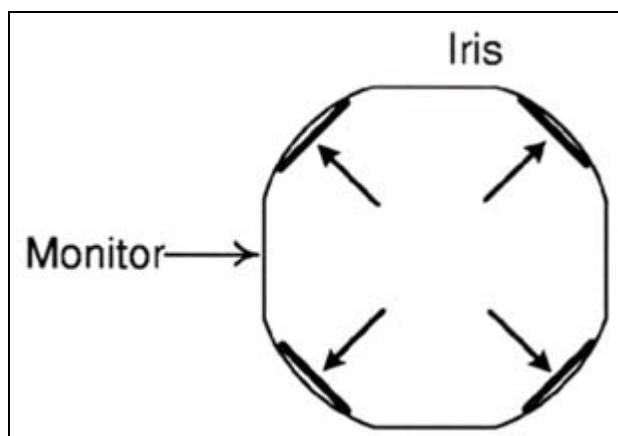


Fig. 8: X-iris



- Move the unit into the 0° position.
- Select zoom format 0 (full format).
- Open the collimator all the way.
- Switch SS to the **ON** position.
- Release FL.
- Check that the X-iris diaphragm leaves are just visible centrally at the edge of the blanking circle (Fig. 8 / p. 17).
 - The X-iris diaphragms must be set such that all 4 X-iris diaphragm leaves are still visible.
 - The distance between the visible leaves and the blanking circle must not exceed 10 mm.
- Check the display of the collimator leaves for all zoom formats.
- Terminate FL.

NOTE

In addition, the tests required under the X-ray regulations of the relevant country (e.g. USA (DHHS), Germany (§16 X-ray Ordinance) ...) must be carried out.

Correction

- Start the XCS SSW.
- Select the menu **Components > Uroskop > Adjustment > Calibration**.
- With fluoroscopy on, set the iris diaphragms with the \pm button.
- Confirm with **OK**.
 - ⇒ A window is displayed with the new and the old value.
- Confirm with **OK**.
 - ⇒ The new value is stored only in the unit.
- Exit the service mode and switch the system off and on to enable permanent storage in the CPU.

- Check the setting.

Checking the cassette

1. Collimator: Direct technique collimation, overframing on film

Only with cassette

The nominal format programmed for the cassette is 35 cm x 43 cm, but the real film size is 35.6 cm x 43.2 cm (14" x 17"). The "overframing" compensates for the difference between the two sizes.

- Select XCS-SSW menu **Components > Uroskop > Adjustment > Calibrations > Collimator > Direct technique collimation, overframing of film** and press the **Execute** button.

Adjustment

- Enter the desired overframing in mm for height and width.
 - ⇒ The old offset values for height and width are displayed in the window.

Tab. 1

Tolerance:	Height and width 0 mm ... + 25 mm . The cassette format applies as a basic value.
Default setting:	Overframing height = 2 ; Overframing width = 6

NOTE

The display on the collimator, from call up to exiting the UROSKOP Access SSW, is not relevant.

- Confirm with **OK**.
 - ⇒ If the **Cancel** is pressed, no adjustment is made.
 - ⇒ Then a window with the old and the new offset value is displayed.
- Confirm with **OK**.
 - ⇒ The new offset values for height and width are now saved only in the unit!
- Exit the service mode and switch the system off and back on again to permanently save the data in the XCU.

Check

- The collimator display must have changed by the amount of the corrected value.
- If necessary, perform the adjustment again.

2.1 Light field / radiation field with centering cross

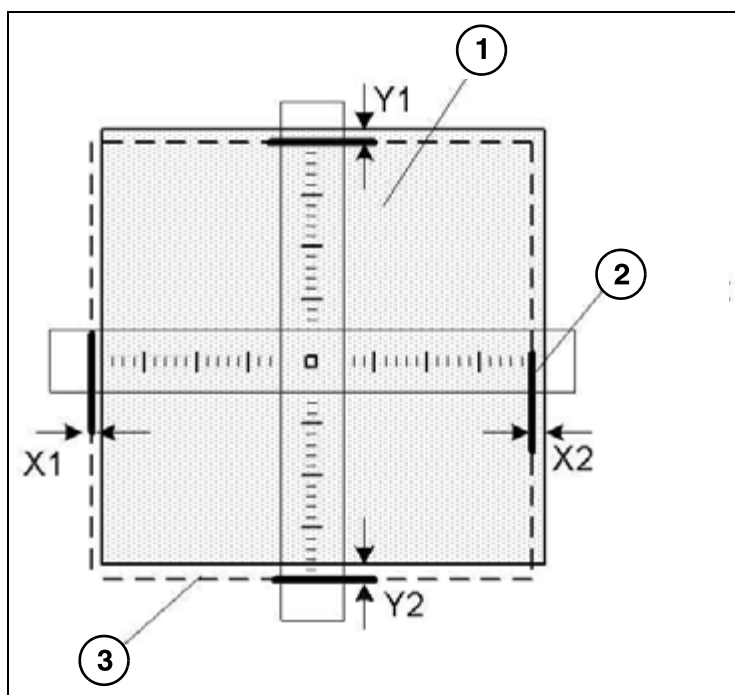


Fig. 9: Light / radiation field 1

Pos. 1 Radiation field
Pos. 2 Soldering wire
Pos. 3 Light field

Prerequisites

NOTE

The alignment of the central ray to the I. I. ([Aligning the central ray to the I.I. / p. 12](#)) has been performed and checked.

- No Cu in the beam path.
- Move the unit into the 0° position.
- Move the tube assembly and I. I. into the exposure position.
- Set a format of 25 cm x 25 cm on the collimator.
- Select a cassette program and set **70 kV, 320 mAs** on the ASPIA imaging system.
- Switch the light localizer on and position the centering cross on the tabletop (without mat) so that it is centered to the beam path.
- Mark the light field with soldering wire on the centering cross ([Fig. 9 / p. 20](#)).

Check



- Release DR exposure.
- Measure the deviations between the light field edges and radiation field edges on all four sides (X1, X2, Y1, Y2) with the help of the centering cross, and note down this data.
- On the monitor, read the width w' and length l' of the radiation field.

- Calculate the deviations in the X and Y directions according to the following formulae (Fig. 10 / p. 21), (Fig. 11 / p. 21).
 - Ignore the algebraic sign of X1, X2, Y1 and Y2 while calculating X1 + X2 and Y1 + Y2.

$$\sum X(\%) = \left(\frac{X1 + X2}{108cm} \right) \times 100 \leq 1.2\%$$

Fig. 10:

$$\sum Y(\%) = \left(\frac{Y1 + Y2}{108cm} \right) \times 100 \leq 1.2\%$$

Fig. 11:

NOTE	Distance from focus to table top = 108 cm
-------------	--

- Calculate the width w and length l of the radiation field in the image reception plane according to the following formulae.
 - systems without cassette: M = 1.065
 - systems with cassette: M = 1.12

w = w' x M	l = l' x M
------------	------------

- Calculate the deviations of the radiation field from the collimator display (w_d, l_d) according to the following formulae.
 - systems without cassette - SID = 115 cm
 - systems with cassette - SID = 121 cm

$$Deviation_width[\%] = \left(\frac{w - w_d}{SID} \right) \times 100 \leq 1.2\%$$

Fig. 12:

$$Deviation_length[\%] = \left(\frac{l - l_d}{SID} \right) \times 100 \leq 1.2\%$$

Fig. 13:

Evaluation

The deviations for X/Y/width/length must not exceed 1.2%.

2.2 Light field / radiation field without centering cross

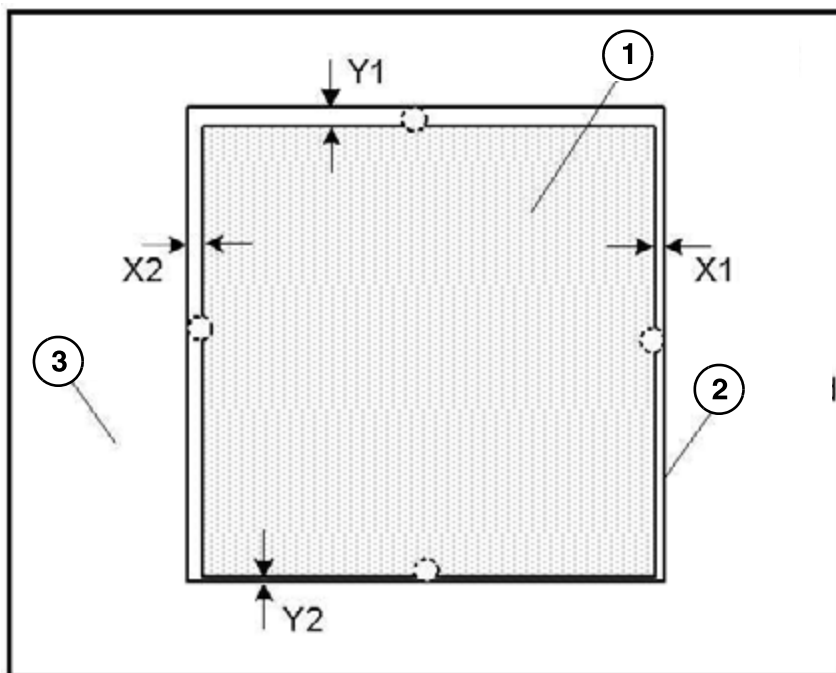


Fig. 14: Light / radiation field 2

Pos. 1 Radiation field
Pos. 2 Light field
Pos. 3 Film

Prerequisites

NOTE

The alignment of the central ray to the I. I. ([Aligning the central ray to the I.I. / p. 12](#)) has been performed and checked.

- Insert a cassette without film.
- System longitudinally in cassette exposure position.
- No Cu in the beam path.
- Select a cassette program and set **70 kV, 320 mAs** on the ASPIA imaging system.
- Move the unit into the 0° position.
- Place a 35 cm x 43 cm cassette on the table (without mat).
- Set a format of 25 cm x 25 cm on the collimator.
- Switch the light localizer on and mark the light field with washers or coins on the cassette ([Fig. 14 / p. 22](#)).

Check



- Release DR exposure.
- Measure the deviations between the light field edges and the radiation field edges on all four sides (X1, X2, Y1, Y2) and note down this data.

- Calculate the deviations in the X and Y directions according to the following formulae (Fig. 15 / p. 23), (Fig. 16 / p. 23).
 - Ignore the algebraic sign of X1, X2, Y1 and Y2 while calculating X1 + X2 and Y1 + Y2.

$$\sum X(\%) = \left(\frac{X1 + X2}{108cm} \right) \times 100 \leq 1.2\%$$

Fig. 15:

$$\sum Y(\%) = \left(\frac{Y1 + Y2}{108cm} \right) \times 100 \leq 1.2\%$$

Fig. 16:

NOTE

Distance from focus to table top = 108 cm

Evaluation

The deviations for X and Y must not exceed 1.2%.

PDA adjustment

Prerequisites

- Move the unit into the -90° position.
- Remove the collision protection cover of the I.I. and the cover of the light distributor.
- Set switch **S1** on D100 board of the light distributor at the I. I. to position **2**.
⇒ The PDA sensor is illuminated for approx. 2 minutes.
- Reattach the cover of the light distributor.
- Set the **SS** switch to **OFF**.
- The fluoroscopy mode "FL-Continuous" must be selected on the ASPIA imaging system.
- Mark the image center on the monitor using a piece of string and adhesive tape.

Adjustment

- In case of PDA sensor overframing, adjust as follows:
 - Start the XCS SSW.
 - Select the menu **Components > Polydoros SX > Adjustment > TV Iris**.
 - Perform the **TV iris Min/Max. Adjust.** and reduce the **Iris Value** (to approx. 180) until the PDA is clearly visible.
 - Confirm the settings with the **OK** and exit the SSW.

NOTE

The adjustment for overframing is completed.

- Release a FL exposure for approx. 10 s (**without radiation**) and store the image.

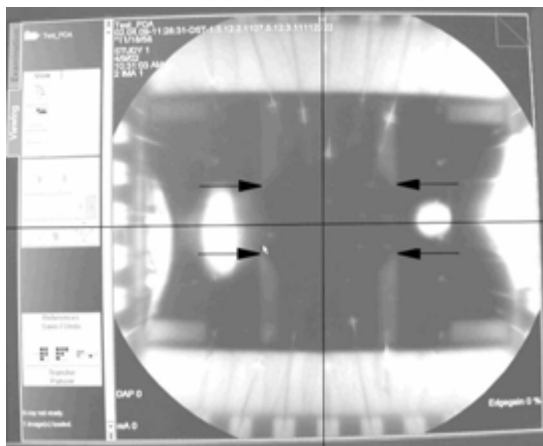


Fig. 17: PDA 1

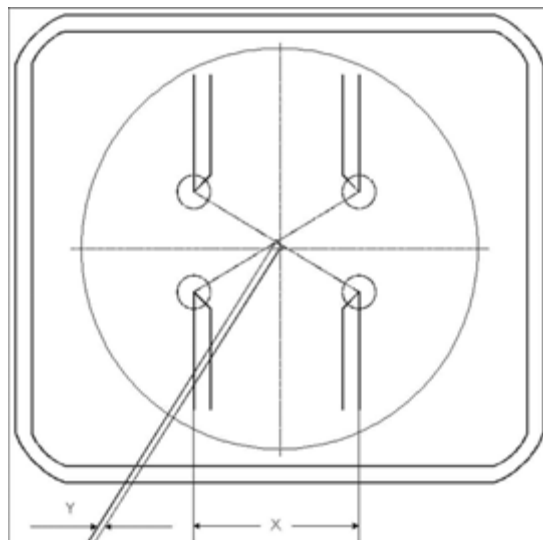


Fig. 18: PDA 2

- To evaluate the stored image, use the outer corners of the light sensor, see [\(Fig. 17 / p. 24\)](#).
- Measure the distance X and the center deviation Y with a ruler, see [\(Fig. 18 / p. 24\)](#).

- Check the measuring field width and the center deviation of the displayed PDA chip against the following table:

I.I. type	TFT monitor 18"		TFT monitor 17"/SIMOMED monitor 17"	
	Dominant width (X)	Center deviation max. (Y)	Dominant width (X)	Center deviation max. (Y)
40 cm	9.6 cm \pm 0.9 cm	0.9 cm	9.0 cm \pm 0.8 cm	0.8 cm
33 cm	11.5 cm \pm 1.1 cm	1.1 cm	10.9 cm \pm 1.0 cm	1.0 cm

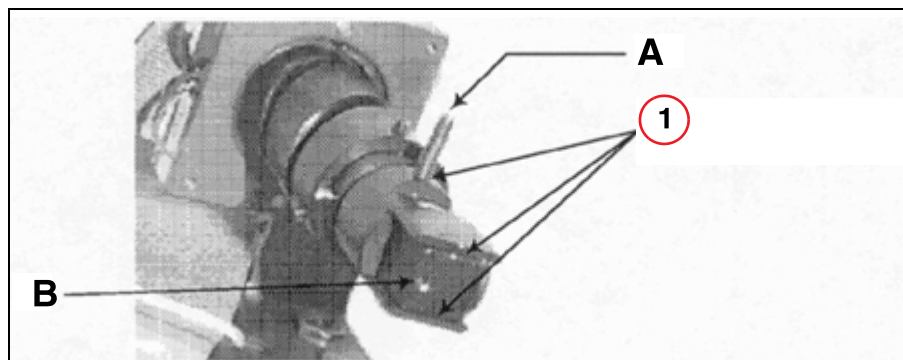


Fig. 19: SDM lacquer
Pos. 1 Red safety lacquer

- In case of PDA deviation, adjust as follows:

NOTE

During adjustment and lacquering be careful that no dirt falls into the optical system and onto other optical surfaces.

- Vertical direction: Loosen the grub screw (A/Fig. 19 / p. 25) and rotate the optical system.
- Horizontal direction: Insert a socket wrench (1 mm) or similar long metal pin into the hole (B/Fig. 19 / p. 25) and tilt the prism carrier by pressing on it lightly.
- Secure the optical system with safety lacquer on the grub screw and on the prism (1/Fig. 19 / p. 25).
- Set switch **S1** on the D100 board of the light distributor at the I. I. back to position **1**.
- Reinstall the covers.
- Set the SS switch to **ON** again.

Dose and PDA adjustment

NOTE

The following three adjustment procedures ([Adjusted mA value during dose setup / p. 26](#)), ([PDA check / p. 27](#)), ([Setting the TV iris diaphragm / p. 29](#)) must always be performed together.

Adjusted mA value during dose setup

Prerequisites

- Move the unit into the 0° position.
- Attach a 1.2 mm Cu filter to the collimator, with the additional filter in the diaphragm **de-selected** (0 mm Cu).
- If there is a patient pad on the tabletop, remove it.
- Place the dose measuring chamber on the tabletop so that the chamber is positioned in the center ray.
- Select a filter value of 23.5 mm/27.5 mm Al (depending on DIADOS version).
- Select the fluoroscopy mode "FL-Continuous".
- Select I.I. full format and the center dominant.

Adjustment

- Start the XCS SSW.
- Select the menu **Components > Polydoros SX > Adjustment > Dose rate**.
- Release FL via the service PC.
- Change the tube current under FL to adjust the dose rate to the following values.



Tab. 2

	Dose rate on tabletop [nGy/s]	Attenuation factor	Entrance dose at I.I. [nGy/s]
without cassette	1740 ± 5 %	2.0	870 (870 nGy/s x 2 = 1740 nGy/s)
with cassette (option)	1905 ± 5 %	2.19	870 (870 nGy/s x 2.19 = 1905 nGy/s)

- Read the dose and record it.
- Switch FL off.
- Confirm the window with **OK**.
 - ⇒ The **PDA Preadjust** menu appears.
- The **PDA Preadjust** menu appears.

NOTE

The [\(PDA check / p. 27\)](#) (described in the following subchapter) is compulsory after this dose setup has been performed.

PDA check**Prerequisites**

- Remove the dose measuring chamber.
- Switches **S1** and **S2** on D100 in generator must be set to position **1**.
- Select zoom to full format (zoom 0) and open the diaphragm all the way.

**Adjustment**

- Release FL via the service PC.
 - ⇒ The displayed **expected actual value [1/4]** must be **0 ± 1**.
- In the case of deviation, adjust as follows:
 - Remove the image distributor cover.
 - In the case of a negative deviation of the **expected actual value [1/4]**, turn R1 on D100 of the light distributor to the left.
 - In the case of a positive deviation of the **expected actual value [1/4]**, turn R1 on D100 of the light distributor to the right.
 - After adjusting with R1 reattach the cover.
- Repeat the measurement.
- Confirm with **OK**.
 - ⇒ The **PDA sensitivity Autocalibration** menu appears.
- Start the autocalibration by selecting the **Start** button.
 - ⇒ The autocalibration is performed automatically for all I.I. formats and dominant combinations.
- Compare the results in the table in **PDA-adjusted value [EP/16]** as follows.

NOTE

If the basic adjustment for the PDA could not be performed correctly, the text "AbsDiff value is bigger than 24!" may appear and indicates an error.

After acknowledging with "OK" a list of the values set is displayed.

On the basis of the values in the first column (I.I. full format) it is possible to determine which dominants were set incorrectly. If more than one dominant was incorrectly adjusted, replace the PDA.

- ⇒ The value **Max. II-Format** for **2 dominants in parallel** must correspond approximately to the value of the **circular dominant (approx. 0)**.
- ⇒ The largest value must result for **all 3 dominants (left, middle, right) in parallel (approx. 65)**.
- ⇒ The value for the **individual dominants** must be **approx. 50**.
- If it can be determined that only one dominant was calculated incorrectly, the error may be in the cabling or on D100.
- In the case of deviations larger than $\pm 30\%$, perform the setting again:
 - Exit the **TV iris Min/Max. Adjust** menu with **Skip**.
 - Select **Cancel**.
 - Select **Dose Rate Adjust** and repeat the adjustment.
- Then exit the **PDA Adjusted Values [EP/16]** window with **OK**.
 - ⇒ The **TV iris: Min/Max. Adjust** window automatically appears.

NOTE

The [\(Setting the TV iris diaphragm / p. 29\)](#) (described in the following subchapter) is compulsory after this PDA check has been performed.

Setting the TV iris diaphragm

Min/max setting

Prerequisites

- The menu **Components > Polydoros SX > Adjustment > TV Iris** is selected automatically after the PDA adjustment.

Adjustment

- In the **TV Iris Diaphragm: Min/Max Adjust** window change reference value A (maximum opening) until the yellow LED (V29) on the D190 board in the generator turns off.
- Repeat this procedure for reference value B (minimum opening) for the yellow LED (V28) on D190 in the generator.
- Confirm with **OK**.
 - ⇒ The **TV Iris Diaphragm: Brightness Adjust** window (Step 1: Fluoro Brightness) automatically appears.

NOTE

The [\(Adjusting the image brightness \(step 1\) / p. 29\)](#) (described in following subchapter) is compulsory after the [\(Min/max setting / p. 29\)](#).

Adjusting the image brightness (step 1)

Prerequisites

- Attach 2.1 mm Cu to the collimator.



Adjustment

- Activate the fluoroscopy function with **ON** and allow the generator to stabilize.
- Switch FL off.
- Store the FL image (ATB button or automatic LIH transfer).

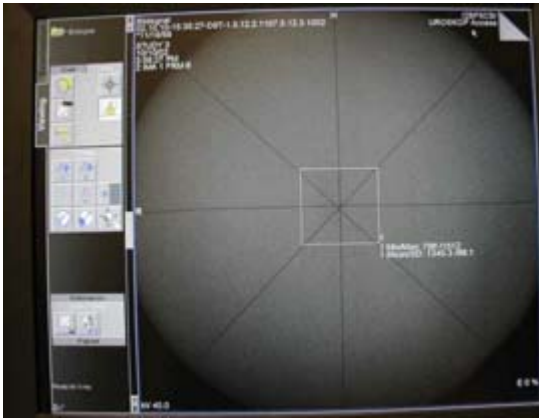


Fig. 20: B/W pixel

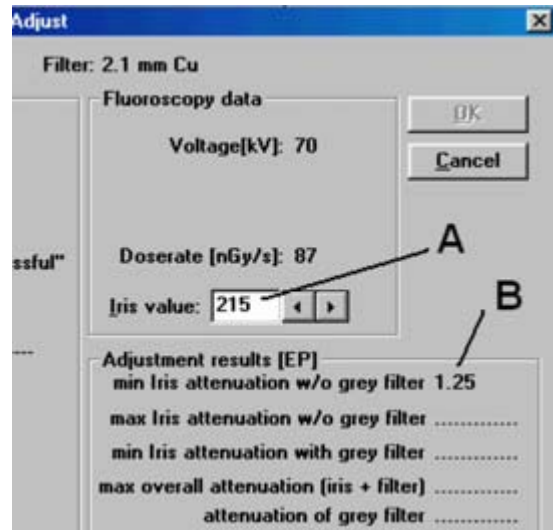


Fig. 21: Desired value iris

- Evaluate the FL image in the viewer as follows:
 - In the imaging system menu bar, select **Options > Local Service**.
 - Enter the password and minimize the service window.
 - Select last image in viewer.
 - In the imaging system menu bar, select **Tools > Rectangle**.
- Operating principle:
 - The mouse pointer is visible with the position pointer.
 - Press the left mouse button and draw a measuring field with a size of up to 10 cm square.
 - Position the mouse pointer on the edge of the square (shift symbol appears), press the left mouse button and position the square in the center of the image.
 - Read off the center value, e.g. 1345.3:
 - 1 Min/Max. 756/1512
 - 1 Mean/SD: **1345.3/66.1**

⇒ A center value **C = 1350 ± 20** must result.

NOTE

The TV iris diaphragm is set in iris values (steps for opening and closing the iris diaphragm) (**A/**[Fig. 21 / p. 30](#)).

The exposure points from the generator are taken over in 1/4 EPs (EP = exposure point) (**B/**[Fig. 21 / p. 30](#)).

For 1/4 exposure point, several steps (opening and closing of the iris) are necessary.

After changing the exposure points and storing with "Successful", select this adjustment again and check the set center value.

- If the correct center value is not obtained, adjust the desired value of the TV iris (the starting value is **approx. 200**) in exposure points in the service menu, make a new FL exposure, store it, and evaluate it again.
- Adjust the TV iris as described above until the required center value of **C = 1350 ± 20** results.
- When the correct center value is obtained, activate the fluoroscopy function with **ON** and confirm **during radiation** with **Successful**.
 - ⇒ The window **TV Iris Diaphragm: Brightness Adjust** changes to **Step 2: Grey filter attenuation**.

Setting the grey filter transfer value (step 2)

Prerequisites

- Attach 1.2 mm Cu to the collimator.

Adjustment



- Activate the fluoroscopy function with **ON** and allow the generator to stabilize.
- Switch FL off.
- Store the FL image (ATB button or automatic LIH transfer).
- Evaluate the FL image in the viewer as follows ([Fig. 20 / p. 30](#)):
 - In the imaging system menu bar, select **Options > Local Service**.
 - Enter the password and minimize the service window.
 - Select last image in viewer.
 - In the imaging system menu bar, select **Tools > Rectangle**.
- Operating principle:
 - The mouse pointer is visible with the position pointer.
 - Press the left mouse button and draw a measuring field with a size of up to 10 cm square.
 - Position the mouse pointer on the edge of the square (shift symbol appears), press the left mouse button and position the square in the center of the image.
 - Read off the center value, e.g. 1345.3:
 - 1 Min/Max. 756/1512
 - 1 Mean/SD: **1345.3/66.1**
 - ⇒ A center value of **C = 1350 ± 20** must result.
- If the correct center value is not obtained, adjust the **Current (mA)** value (the starting value is approx. 2.5 mA) in the service menu, make a new FL exposure, store it and evaluate it again.
- Adjust the TV iris as described above until the correct center value of **C = 1350 ± 20** results.
- When the correct center value is obtained, activate the fluoroscopy function with **ON** and confirm during radiation with **Successful**.

Iris attenuation

NOTE

The “TV Iris Attenuation” menu is selected automatically.



- Activate the fluoroscopy function with **ON** and allow the generator to stabilize.
- Switch fluoroscopy off.
- Store the FL image (ATB button or automatic LIH transfer).
- Evaluate the FL image in the viewer as follows (Fig. 20 / p. 30):
 - In the imaging system menu bar, select **Options > Local Service**.
 - Enter the password and minimize the service window.
 - Select last image in viewer.
 - In the imaging system menu bar, select **Tools > Rectangle**.
- Operating principle:
 - The mouse pointer is visible with the position pointer.
 - Press the left mouse button and draw a measuring field with a size of up to 10 cm square.
 - Position the mouse pointer on the edge of the square (shift symbol appears), press the left mouse button and position the square in the center of the image.
 - Read off the center value, e.g. 1345.3:
 - 1 Min/Max. 756/1512
 - 1 Mean/SD: **1345.3/66.1**
 - ⇒ A center value of **C = 1350 ± 20** must result.
- If the correct center value is not obtained, adjust the desired value (the starting value is approx. 40) of the TV iris in the service menu, make a new FL exposure, store it, and evaluate it again.
- Adjust the TV iris as described above until the correct center value of **C = 1350 ± 20** results.
- When the correct center value is obtained, activate the fluoroscopy function with **ON** and confirm during radiation with **Successful**.
- Confirm the window with **OK**.
- Exit the service mode and switch the system off and then back on to save the settings in the CPU.

Zoom / Iris correction

Prerequisites

- Attach 2.1 mm Cu to the collimator.
- Select the menu **Adjustment > Zoom Iris Correction** and follow the instructions in the service menu.
- Open the collimator leaves.

Checking the I.I. full format



- A check of the fluoroscopic image in the viewer for the **I.I. full format** must result in the same image impression as previously set.
- Activate the fluoroscopy function with **ON** and allow the generator to stabilize.
- Switch fluoroscopy off.
- Store the FL image (ATB button or automatic LIH transfer).
- Evaluate the FL image in the viewer as follows (Fig. 20 / p. 30):
 - In the imaging system menu bar, select **Options > Local Service**
 - Enter the password and minimize the service window.
 - Select last image in viewer.
 - In the imaging system menu bar, select **Tools > Rectangle**.
- Operating principle:
 - The mouse pointer is visible with the position pointer.
 - Press the left mouse button and draw a measuring field with a size of up to 10 cm square.
 - Position the mouse pointer on the edge of the square (shift symbol appears), press the left mouse button and position the square in the center of the image.
 - Read off the center value, e.g. 1345.3:
 - 1 Min/Max. 756/1512
 - 1 Mean/SD: **1345.3/66.1**
- With the correct TV iris setting, the center value must be **C = 1350 ± 20** .

Adjustment



- For all zoom steps the same actual brightness value must result as for full format.
- Proceed as follows for all zoom steps:
 - Activate the fluoroscopy function with **ON** and allow the generator to stabilize.
 - Switch fluoroscopy off.
 - Store the FL image (ATB button or automatic LIH transfer).
- Evaluate the FL image in the viewer as follows (Fig. 20 / p. 30):
 - In the imaging system menu bar, select **Options > Local Service**.
 - Enter the password and minimize the service window.
 - Select last image in viewer.
 - In the imaging system menu bar, select **Tools > Rectangle**.
- Operating principle:
 - The mouse pointer is visible with the position pointer.
 - Press the left mouse button and draw a measuring field with a size of up to 10 cm square.
 - Position the mouse pointer on the edge of the square (shift symbol appears), press the left mouse button and position the square in the center of the image.
 - Read off the center value, e.g. 1345.3:
 - 1 Min/Max. 756/1512
 - 1 Mean/SD: **1345.3/66.1**
 - With the correct TV iris setting, the center value must be **C = 1350 ± 20** .

- If the correct center value is not obtained, adjust the correction value for the zoom step in the service menu, make a new FL exposure, store it and evaluate it again.

NOTE

The correction values are set in 1/4 exposure points. Therefore, the tolerance of the center value is higher.

- Perform the adjustment until the correct value is obtained.
- When the correct center value is obtained, activate the fluoroscopy function with **ON** and confirm during radiation with **Successful**.
- When all zoom steps are adjusted, confirm the window with **OK**.
- Exit the service mode and switch the system off and then back on to save the settings in the CPU.

Brightness correction for DR and PFL

Prerequisites

NOTE

The prerequisites for this adjustment are successfully performed adjustments according to the following sections: ([Dose and PDA adjustment / p. 26](#)), ([Min/max setting / p. 29](#)), ([Adjusting the image brightness \(step 1\) / p. 29](#)), ([Setting the grey filter transfer value \(step 2\) / p. 31](#)), ([Iris attenuation / p. 32](#)), ([Zoom / Iris correction / p. 32](#)).

- An organ program with the characteristic curve "Antiisowatt Access" is selected.
- Attach 2.1 mm Cu to the collimator.
- Select I.I. full format.
- Select **Adjustment > TV Param** in the XCS SSW.



Checking PFL

- Under **PFL**, select all pulse frequencies in sequence or enter the pulse frequencies, release radiation for each pulse frequency and allow the generator to stabilize.
- Checking:
 - 12.5 f/s; dose level "low", "medium", "high"
 - 6 f/s; dose level "medium"
 - 3 f/s; dose level "medium"
- Check the image brightness from the second release of radiation as described in the setting in ([Adjusting the image brightness \(step 1\) / p. 29](#)).
- A center value of **C = 1350 ± 10 %** must result for all pulse frequencies.

Adjustment

- If the correct center value is not obtained, adjust the corresponding correction value in the service menu, make a new FL exposure, store it, and evaluate it again.
- Select **Adjustment > TV Param** in the XCS SSW.



- In the **Mode > Fluoro** menu, select the **Pulsed** mode.
- Select the pulse frequency (frequencies) with the deviation, change the correction value **Iris Correction [1/4 EP]**, store it with **Put to Unit**, and check the center value as described.
- Repeat the adjustment until the required center value of **C = 1350 ± 50** is obtained.

Checking DR



- Select the **DR** mode with single image and release radiation.
- Check the image brightness as described in [\(Adjusting the image brightness \(step 1\) / p. 29\)](#).
- A center value of **C = 1350 ± 10 %** must result for all pulse frequencies.

Adjustment



- If the correct center value is not obtained, adjust the corresponding correction value in the service menu, make a new FL exposure, store it, and evaluate it again.
- In the XCS SSW, select **Adjustment > TV Param.**
- Select **Exposure > DR.**
- Change the correction value **Iris correction [1/4 EP]**, store it with **Put to Unit**, and check the center value as described.
- Repeat the adjustment until the required center value of **C = 1350 ± 50** is obtained.
- Perform the check for all frame rates and readjust, if necessary.

Checking the dose rate

Prerequisites

- Move the unit into the 0° position.
 - Place the dose measuring chamber on the tabletop (without table mat) as shown in (Fig. 22 / p. 36).
 - It takes place in zoom format 3 and is then used for all I. I. formats.
 - Place 2.1 mm Cu precision filter in the beam path.
 - Select the following organ programs (characteristic curve in brackets):
1. **FL**
 - S2 (C03 Iodine)
Middle dose, middle measuring field
 2. **PFL**
 - IVP (Antiisowatt Access)
12.5 f/s; middle dose, middle measuring field
 3. **DR**
 - S1 (C74-special)
single frame; middle dose; middle measuring field
 - Prior to exposure FL **ON** for kV transfer

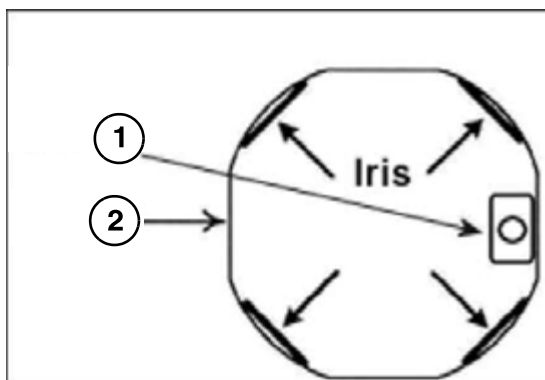


Fig. 22:

Pos. 1 Diados chamber

Pos. 2 Monitor



Measurement

- Release FL with the FL button on the control console twice, but take only the second release of radiation for this check.
- Check the specified dose values.
- The values stated in the table below must result for the respective operating modes and I.I. formats. Only the values shown in boldface type need to be checked.
 - Table A: I.I. 33/40; without cassette
 - Table B: I.I. 33/40; with cassette

NOTE

When selecting the DR operating mode (in accordance with Tables A and B shown below), 70 kV must always be selected.

Tab. 3 Table A: I.I. 33/40, without cassette

Mode	Image format	I.I.	Dose stage			Unit
			low	medium	high	
FL	Full format	40	121	173	347	nGy/s
	Zoom 1		197	281	562	
	Zoom 2		391	558	1116	
	Zoom 3		643	919	1838	
PFL 12.5 f/s	Full format	40	61	87	174	nGy/s
	Zoom 1		98	140	280	
	Zoom 2		195	279	558	
	Zoom 3		322	460	920	
DR 0-point/ Single	Full format	40	455	911	1822	nGy/f
	Zoom 1		738	1476	2952	
	Zoom 2		1467	2933	5866	
	Zoom 3		2414	4828	9656	

The following tolerance values apply for the dose rates in Tab. A/Tab. B:

Tolerance values: FL $\pm 10 \%$
 PFL $+15/-5\%$
 DR $\pm 10 \%$

Tab. 4 Table B: I.I. 33/40; with cassette

Mode	Image format	I.I.	Dose stage			Unit
			low	medium	high	
FL	Full format	40	133	190	381	nGy/s
	Zoom 1		216	308	617	
	Zoom 2		429	613	1226	
	Zoom 3		706	1009	2018	

PFL 12.5 f/s	Full format	40	67	95	190	nGy/s
	Zoom 1		108	154	308	
	Zoom 2		215	307	614	
	Zoom 3		353	504	1008	
DR 0-point/ Single	Full format	40	500	1000	2000	nGy/f
	Zoom 1		810	1620	3240	
	Zoom 2		1610	3220	6440	
	Zoom 3		2650	5300	10600	
FL	Full format	33	187	267	534	nGy/s
	Zoom 1		413	590	1180	
	Zoom 2		706	1009	2018	
	Zoom 3		1119	1599	3198	
PFL* 12.5 f/s	Full format	33	94	134	268	nGy/s
	Zoom 1		207	295	590	
	Zoom 2		353	505	1010	
	Zoom 3		560	800	1600	
DR 0-point/ single	Full format	33	700	1400	2800	nGy/f
	Zoom 1		1400	2800	5600	
	Zoom 2		2600	5200	10400	
	Zoom 3		4000	8000	16000	

Water equivalent adjustment

- Using an available application program, select the characteristic curve "C29 special" from the application tab **Exposure** and save this application program.

NOTE

Make a note of the previously selected characteristic in order to restore the original configuration of the application program after the water equivalent adjustment.

- Start the XCS SSW and set switch S3 (on board D100 in the generator) to **Service**.
- Select the menu **Components > Polydoros SX > Adjustment > Water Equivalent** in the XCS-SSW.
- Place a water phantom (20 cm) in the beam path.
- Select the center dominant.
- Collimate to the water phantom.

Adjustment

- Release FL.
- The correction value is determined by pressing the **Evaluate** button. Repeat this procedure several times until the determined correction value has stabilized.
- Confirm the window with **OK**.

Check

- Release FL.
 - ⇒ kV values in the range of 68 - 71.5 kV must result.
- Terminate XCS SSW and set switch S3 to **Normal**.

Prerequisites

This chapter comprises the mechanical calibration of the following components:

- lift drive
- tilt drive
- exposure system
- tube parking drive
- cassette drive
- tabletop, longitudinal
- tabletop, transverse
- collimator

NOTE

The pinion gear may not exert any axial or radial pressure on the potentiometer. Because of this, there must always be a minimum gap between the pinion gear on the potentiometer and the pinion gear/tooth belt/toothed rack coupled to the movement.

NOTE

When all adjustments have been completed:

- exit the service mode,
- switch the system off/on again,
- check the functionality of the adjustments.

Movement of drives with service keys S1/S2

NOTE

This subchapter describes how the drive to be calibrated can be moved using service buttons S1/S2 at the tableside control unit at the table in “limited end positions“ mode.

- Connect the service PC via the service cable to the generator (XCU D320 [X5]).
- Start XCS SSW.
- Select **Components > Uroskop**.
 - ⇒ The UROSKOP Access SSW starts.
- Select **Diagnostic > Tests**.
 - ⇒ The **Execute Test Function** window appears.

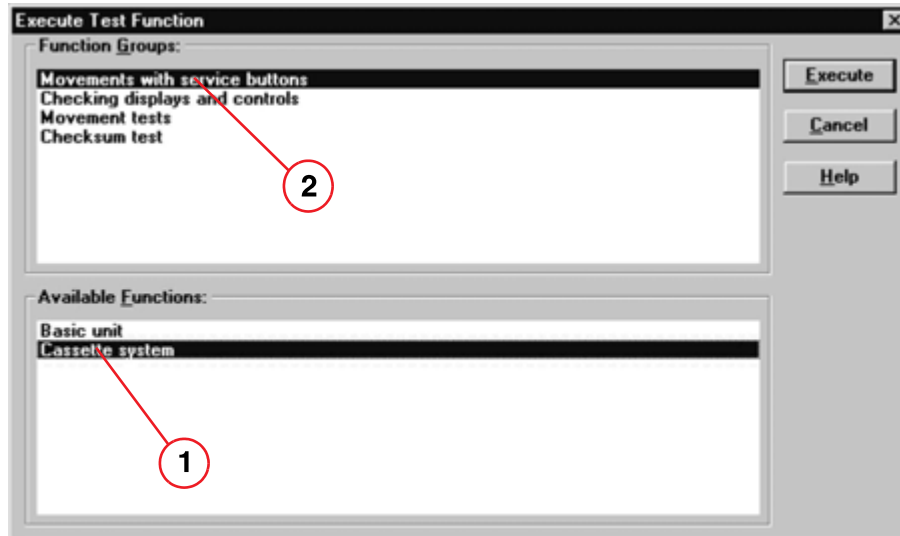


Fig. 23: Window "Execute Test Function"

- Select **Movements with service buttons** under **Function Groups** (2/Fig. 23 / p. 41).
- If you select **Basic unit** (1/Fig. 23 / p. 41) under **Available Functions**, the following window appears (Fig. 24 / p. 42) after selecting **Execute**.
 - Select **Limited end positions** under **Mode**.
 - Select the drive to be moved using service keys **S1/S2** under **Drive**.
 - Move the drive with **S1/S2**.
- If you select **Cassette system** (1/Fig. 23 / p. 41) under **Available Functions**, the following window appears (Fig. 25 / p. 42) after selecting **Execute**.
 - Select **Limited end positions** under **Mode**.
 - Select the drive of the cassette to be moved using service keys **S1/S2** under **Drive**.
 - Move the drive with **S1/S2**.

Movements with service buttons: Basic unit

Select the drive and then the mode.
 "Table transverse" backside = S1
 "Table transverse" frontside = S2
 S1 down
 S2 up

Mode
☒ Limited end positions
☐ Unlimited end positions

Drive
☒ Table lift
☐ Table tilt
☐ Tabletop, longitudinal
☐ System longitudinal
☐ Tabletop, transverse
☐ Tube parking

State
Passive

Position
1253 bits

Press Enter when done

OK Help

Fig. 24: Movements with service buttons: Basic unit

Movements with service buttons: Cassette system

Select the drive and then the mode.
 "Table transverse" backside = S1
 "Table transverse" frontside = S2
 S1 exposure position
 S2 parking position

Mode
☒ Limited end positions
☐ Unlimited end positions
☒ Slow
☐ Very slow

Drive
☒ Cassette drive
☐ Cassette feeder

State
Passive

Position
679 bits

Press Enter when done

OK Help

Fig. 25: Movements with service buttons: Cassette system

Zero adjustment method

NOTE

This subchapter describes how to access the appropriate UROSKOP Access SSW window for adjustments according the zero adjustment method mentioned in the following subchapters.

- Select **Adjustment > Calibrations** in the UROSKOP Access SSW.
⇒ The **Execute Calibration Function** window appears.

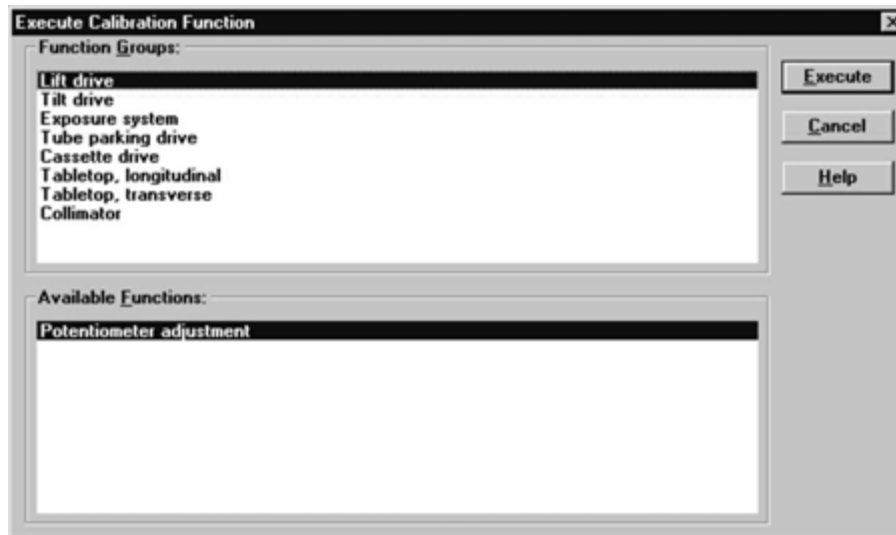


Fig. 26: "Execute Calibration Function" Window

- To perform an adjustment, select the desired component from the **Function Groups** and **Available Functions** submenus and confirm by double-clicking or click the **Execute** button.

Calibration of lift drive

Prerequisites

- Move the unit into the 0° position.
- Using the service keys, move the lift drive into the reference position ([Fig. 27 / p. 44](#)).

NOTE

The reference position is 600 ± 1 mm from the table support edge to the finished flooring.

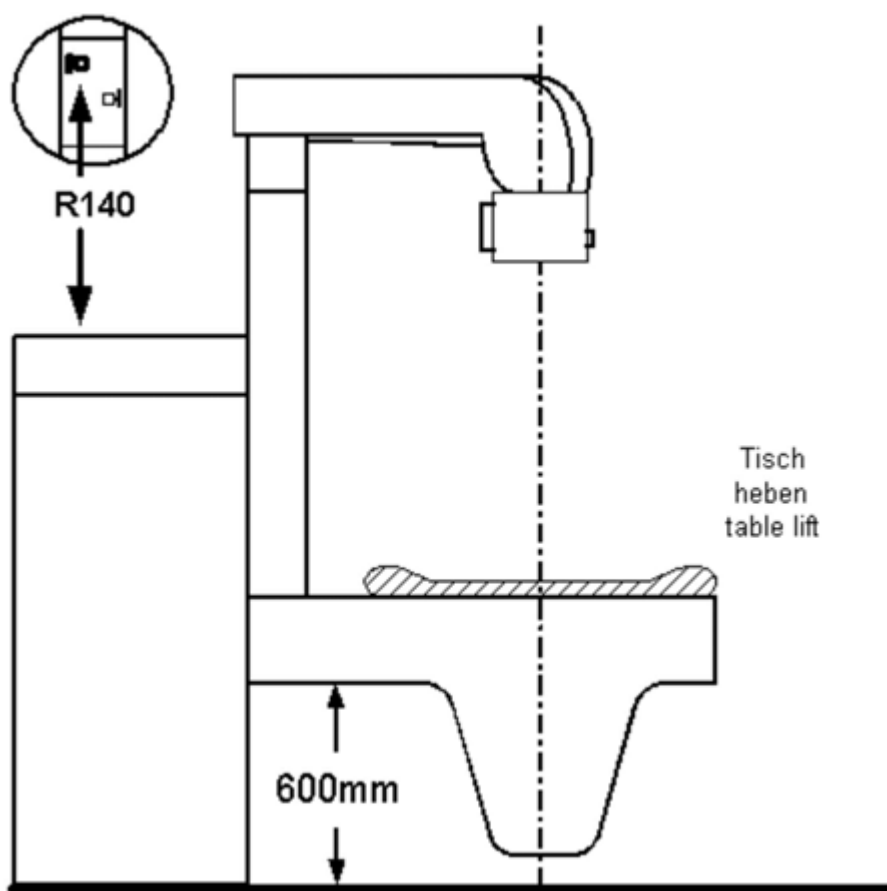


Fig. 27: Adjustment - table lift

Adjustment

Access: through lifting base (see arrows ([Fig. 27 / p. 44](#)))

Potentiometer: M2.R140

Board and connectors: D1.X141 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the drive into the min. position.
 - ⇒ I. I. distance to floor (with I. I. collision protection) ≥ 4 cm (≥ 8 cm for systems with 33 cm I. I.; see also subchapter [Room dimensions / p. 64](#)).

Calibration of tilt drive (+/- 90°)

Prerequisites

- Using the service keys, move the tilt drive into the reference position (Fig. 28 / p. 46).

NOTE

Two equal reference positions are possible:

1. Use a spirit level placed on the tabletop at $0 \pm 0.5^\circ$.
2. Adjust the distance from the top surface of finished floor to the tabletop head end/foot end so that they are equal (+/- 5mm).

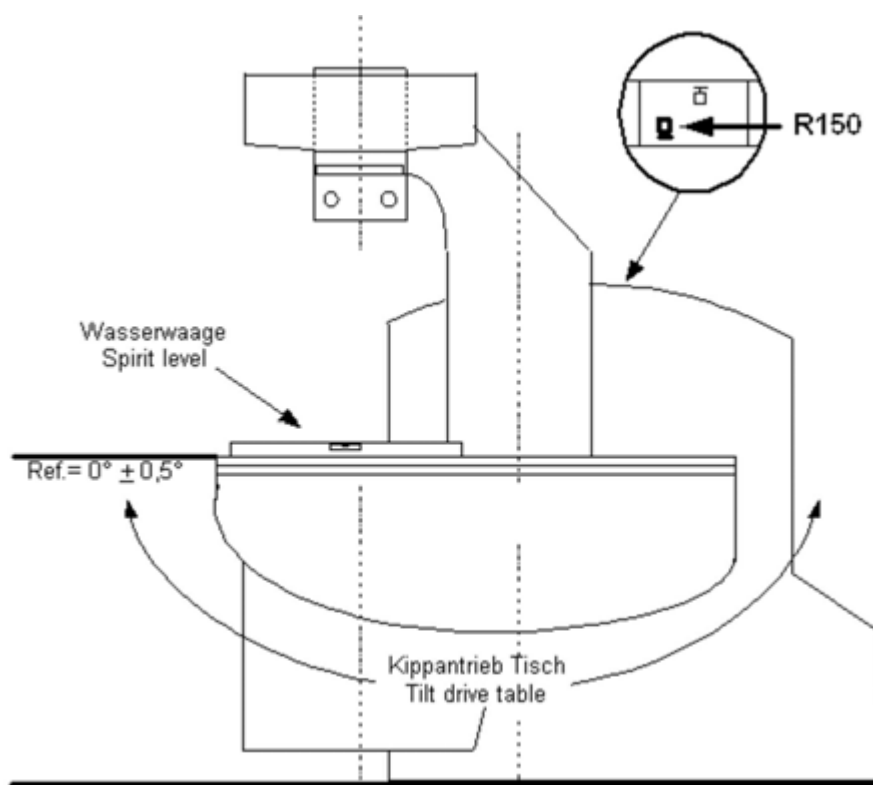


Fig. 28: Adjustment - table tilt

Adjustment

Access: Through lifting base (see arrows (Fig. 28 / p. 46)).

Potentiometer: M2.R150

Board and connector: D1.X151 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the tilt drive to max. +/-.
 - ⇒ The spacing of the opening in toothed segment to safety switch M2.S150 has to be at least 3 mm.
- Move the unit into the 0° position and check the position.

Correction

- If necessary, correct by adjusting the potentiometer.

Calibration of tilt drive (limitation of +90° position)

Prerequisites

The potentiometers for the lift drive, tilt drive (+/- 90°) and tabletop longitudinal drive have been adjusted.

NOTE

On customer request, the standard end position can be changed.

- Use the service keys to move the unit to the desired end position, e. g. +88°.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the unit approx. 10° out of the end position and then back into the end position.

Required

Movement to the required end position.

Correction

- Perform the adjustment again.

Calibration of tilt drive (limitation of -90° position)

Prerequisites

The potentiometers for the lift drive, tilt drive (+/- 90°) and tabletop longitudinal drive have been adjusted.

NOTE

On customer request, the standard end position can be changed.

- Use the service keys to move the unit to the desired end position, e. g. -88°.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the unit approx. 10° out of the end position and then back into the end position.

Required

Movement to the required end position.

Correction

- Perform the adjustment again.

Calibration of exposure system

Prerequisites

NOTE

Prior to this calibration, the central ray alignment ([Setting the central ray / p. 12](#)) has to be checked.

- Set the table in the +90° position.
- Using the service keys, move the system longitudinal drive to the reference position ([Fig. 29 / p. 50](#)).

NOTE

The reference position is 170 ± 1 mm distance between both edges ([Fig. 29 / p. 50](#)).

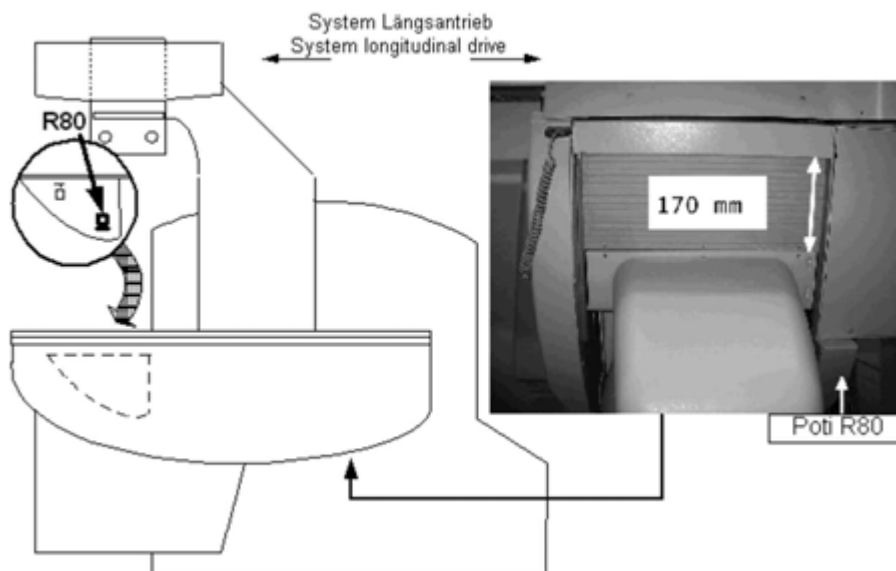


Fig. 29: Adjustment - system longitudinal

Adjustment

Access: Remove the cover at the foot end (see arrow ([Fig. 29 / p. 50](#))).

Potentiometer: M3.R80

Board and connector: M2.U80 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.

- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check - max. head end

- Move the exposure system to max. head end.

Required

NOTE

The following distance required applies only for systems without a cassette option!

Minimum distance to the safety end switch is 5 mm.

Correction

- Adjust the potentiometer M3.R80.

Check - max. foot end

- Move the exposure system to max. foot end.

Required

Minimum distance to the safety end switch is 5 mm.

Correction

- Adjust the potentiometer M3.R80.

Final check

- Check the central ray alignment of the cassette ([Checking the coincidence of the radiation field center with the film center / p. 14](#)).

Calibration of tabletop, longitudinal

Prerequisites

- Use the service keys to move the tabletop longitudinal drive to the reference position at foot end (Fig. 30 / p. 52).

NOTE

The reference position is the tabletop flush with frame (+/- 1 mm) at the foot end (Fig. 30 / p. 52).

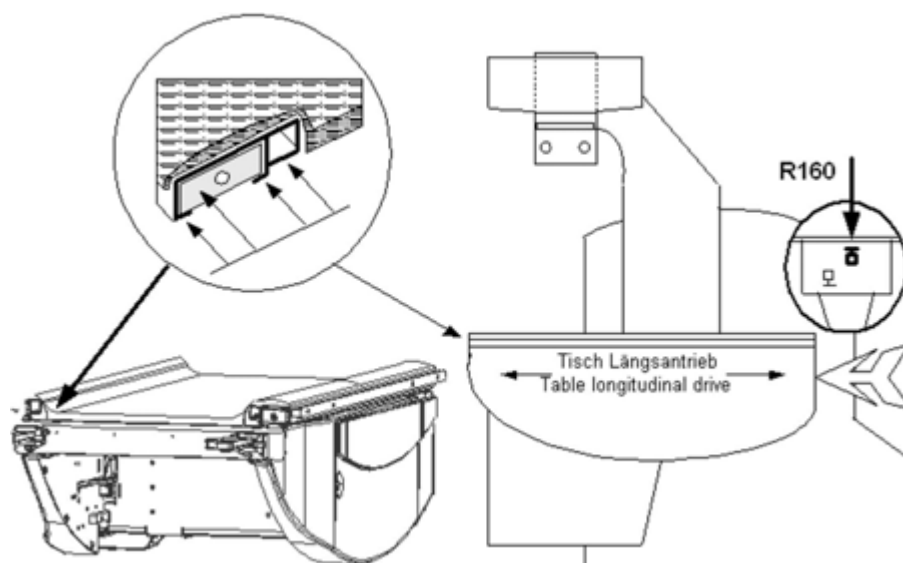


Fig. 30: Adjustment - tabletop longitudinal

Adjustment

Access: At table head end (see arrow (Fig. 30 / p. 52)).

Potentiometer: M5.R160

Board and connector: D1.X161 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.

- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the table to the 0° position.
- Move the tabletop longitudinal to the maximum headwards/footwards.

Required

+ 200/- 500 mm (+/- 5 mm)

NOTE

The limitation of the movements, if the system is tilted > 60°, must be taken into consideration.

Correction

- Adjust potentiometer M5.R160.

Calibration of tabletop, transverse

Prerequisites

- Remove front cover of column.
- Use the service keys to move the table into reference position (Fig. 31 / p. 54).

NOTE

The reference position of the table is 200 ± 1 mm distance from column to table accessory rails (Fig. 31 / p. 54).

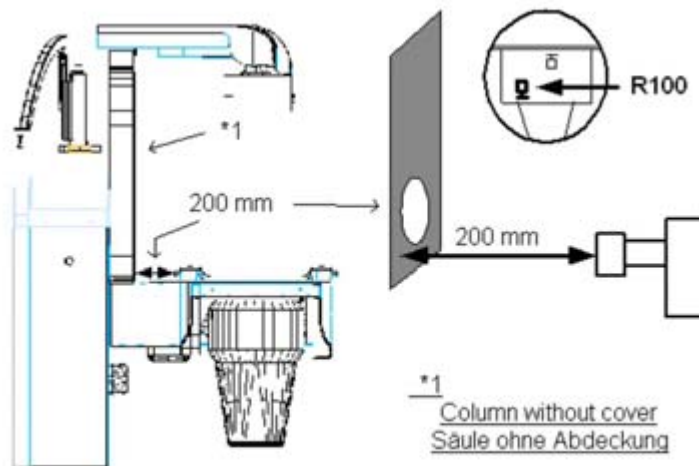


Fig. 31: Adjustment - tabletop transverse

Adjustment

Access: At table head end (see arrow (Fig. 31 / p. 54)).

Potentiometer: M6.R100

Board and connector: BUC D1.X101 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.

- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Move the table max. forwards and backwards.

Required

The range distance is +/- 12.5 cm.

Calibration of tube parking drive, speed

NOTE

The current percent speed is displayed in the SSW window and can be changed in steps using the +/- button within a range of 30% to 100%.

8 - 9 seconds are required to move from the park position to the work position.

The following limitations can be set at the customer's request:

- The speed can be reduced only as much as a reliable movement and braking of the drive is assured into all unit positions.

NOTE

Otherwise very sporadic errors will occur!

- The speed can be increased only as much as a reliable switch-off of the range limit switch is assured. Otherwise, the tube can hit the end stop hard!

NOTE

Otherwise, the tube can hit the end stop hard, which can lead to mechanical deformation!

- The new speed setting is effective when **OK** is pressed.
 - ⇒ A window with the new and old percent speed is displayed.
- Confirm with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- With the required setting of 8 sec. - 9 sec., carry out the movement of the tube and check the time.
- With the setting requested by the customer, check the movement of the tube for reliable function.
 - ⇒ The position switches must be activated safely in exposure and park position.
 - ⇒ The drive must stand at mechanical stop.

Correction

- Perform adjustment again.

Calibration of cassette drive

Prerequisites

- The calibration of the exposure system has to be performed prior to this adjustment work ([Calibration of exposure system / p. 50](#)).
- Remove the cover head end.
- Move the cassette to the reference position (([Fig. 33 / p. 58](#)), ([Fig. 34 / p. 58](#))) using the service keys **S1/S2**.

NOTE

Reference position: Side plate edge ([1/ Fig. 34 / p. 58](#)) and cassette box edge ([2/ Fig. 34 / p. 58](#)) have to be flush (± 1 mm).

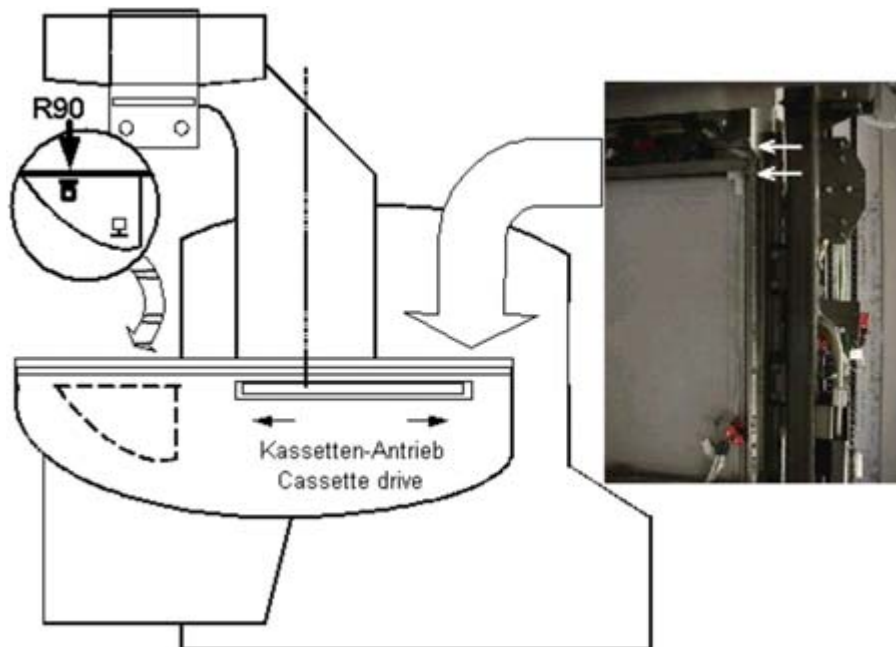


Fig. 32: Adjustment - cassette drive

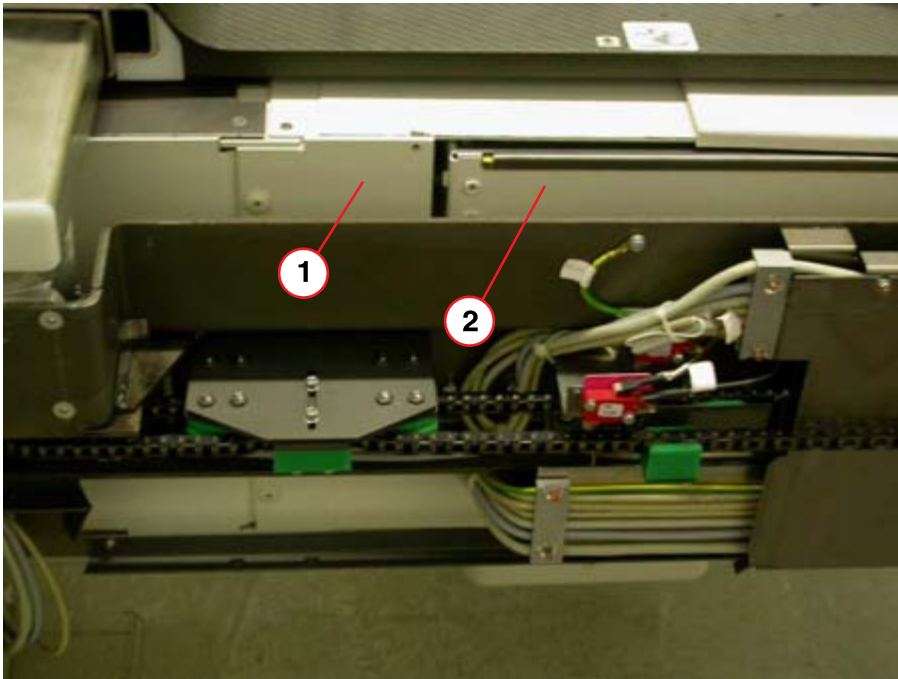


Fig. 33: Cassette position - 1

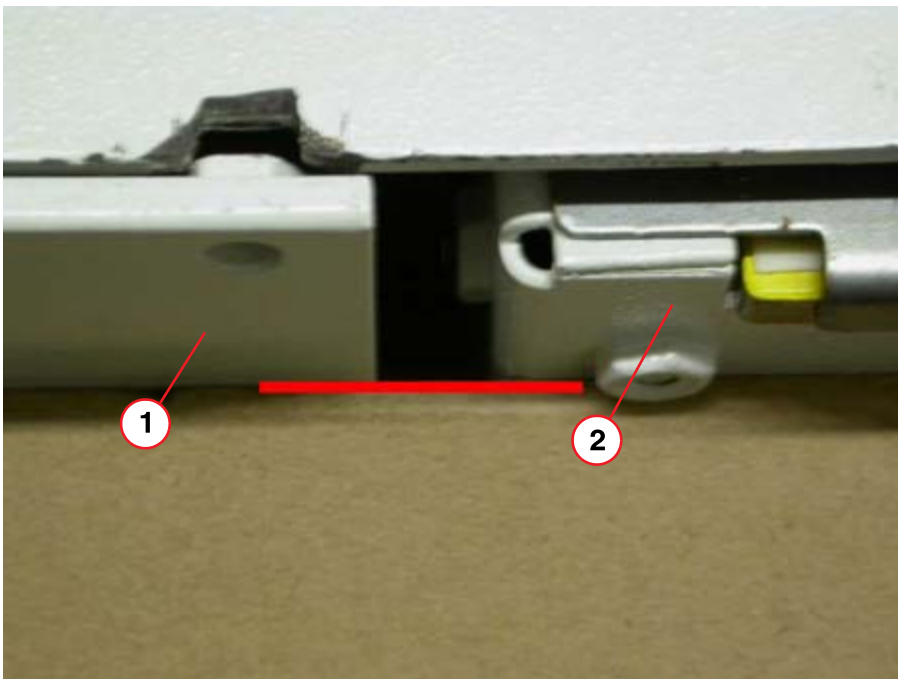


Fig. 34: Cassette position -2

Adjustment

Access: At table foot end (see arrow (Fig. 32 / p. 57)).

Potentiometer: M3.R90

Board and connector: M4.U90.X101 (see circuit diagram)

- Adjust the potentiometer using the zero adjustment method.
 - Loosen the pinion gear at the shaft of the potentiometer.
 - Turn the shaft of the potentiometer.
 - The correction value, the old offset value and the tolerance are displayed in the SSW window.
 - The value is within tolerance when an acoustic signal sounds.
 - After the setting, fasten the pinion gear at the shaft of the potentiometer in place.
- Confirm the SSW window with **OK**.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new offset value.
- Confirm with **OK**.
 - ⇒ The new offset value is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Check the cassette loading position.
- Carry out the check of the central ray alignment of cassette ([Checking the coincidence of the radiation field center with the film center / p. 14](#)).

Calibration of cassette, load speed

NOTE

Changing the parameters affects the time it takes for the cassette to load.

The basic speed is equal to 55% (adjustment range 45% - 90%).

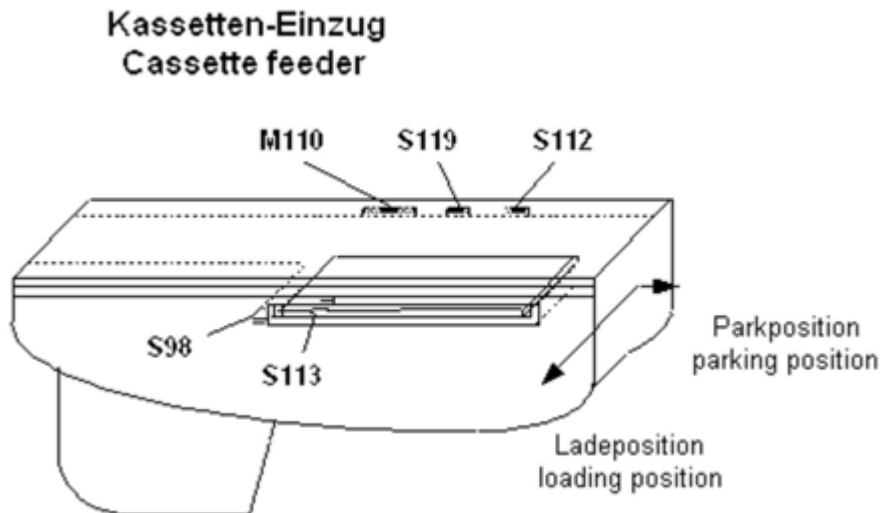


Fig. 35: Adjustment - cassette feeder

M110	motor
S98	cassette tray
S113	cassette front
S112	cassette rear
S119	cassette registration

Adjustment

- Place a 35 cm x 43 cm cassette into the load slot.
- Press the insert button.

Required

The cassette moved into the park position.

- Perform the test several times.
- Enter the percent speed using the +/- buttons.
 - ⇒ A change in speed is evident only when steps with changes of 3% or more are made. When this is done, the old and the new speed are displayed in the window.

- The new speed becomes effective when **OK** is pressed.
 - ⇒ If **CANCEL** is pressed, no adjustment is performed.
 - ⇒ A window is displayed with the old and the new speed.
- Confirm with **OK**.
 - ⇒ The new speed is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Collimator, speed of plates

The speeds in the individual zoom steps and the individual plates for width, height and iris cannot be affected. These are derived from the basic speed.

Adjustment

- Select **Adjustment > Calibrations** in the UROSKOP Access SSW.
⇒ The **Execute Calibration Function** window appears.



Fig. 36: "Execute Calibration Function" Window

- Select **Collimator** under **Function Groups** and **Speed of plates** under **Available Functions** and confirm by double-clicking or click the **Execute** button.
- Select the desired basic speed according to the customer's request.
- Enter the speed value using the **+/-** buttons (range of values: 3 - 31).
⇒ When this is done, the old and new speed values are displayed in the window.
- The new speed value becomes effective when **OK** is pressed.
⇒ If **CANCEL** is pressed, no adjustment is performed.
⇒ A window is displayed with the old and the new speed values.
- Confirm with **OK**.
⇒ The new speed is now saved only in the unit.
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Check the desired basic speed value.

Correction

- Repeat the adjustment.

Collimator, switch-on time light localizer lamp

The switch-on time is adjustable in 3 steps: 30 / 60 / 90 seconds.

Adjustment

- Select the desired time.
- Confirm with **OK**.
 - ⇒ The new time is now saved only in the unit!
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Check

- Check the desired time.

Correction

- Repeat the adjustment.

Room dimensions

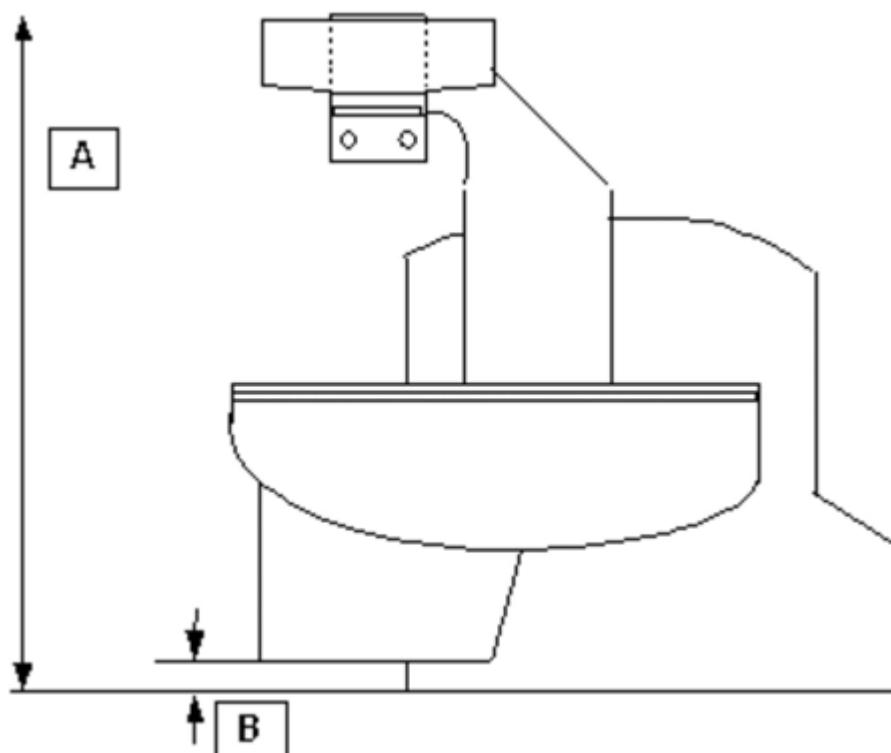


Fig. 37: Room dimensions - 1

NOTE

The room dimensions are used as a basis for collision calculation. They can be entered in cm or inches. In principle, only the distances to the first obstruction, e. g. the ceiling rails in the tilt range, are used as measurement value.

NOTE

The collision computer allows the attachment of a footboard at the head end and foot end, i. e. for calculation purposes the table length is considered to be extended by 30 cm at both ends.

NOTE

The SSW automatically limits the unit movement.
Observe the country-specific safety regulations.

Ceiling height/distance from floor to I. I.

NOTE

The factory default value "Distance from floor to I. I." is 6 cm.

NOTE

Only valid for UROSKOP Access with 33 cm I. I.!

The default value for “Distance from floor to I. I.” is 10 cm.

NOTE

With configuration of the unit and of the correct I. I. size, the “Distance from floor to I. I.” range is automatically displayed in the SSW.

NOTE

The distance 4...40 cm entered in the UROSKOP Access SSW refers to the distance between the bottom edge of the I. I. and the floor and must be at least 6 cm/10cm.

The distance between the I. I. collision protection and the floor is therefore approx. 2 cm lower (4 cm/8 cm).

- Move the unit into 0° position.
- Measure the distance A from the floor to the ceiling (Fig. 37 / p. 64).
- Select **Components > Uroskop**.
 - ⇒ The UROSKOP Access SSW starts.
- Select **Adjustments > Room Dimensions**.
- Enter the **Room height** and **Distance from floor to I. I.** (Fig. 38 / p. 65).
 - ⇒ A safety distance of 5 cm is always taken into consideration for the **Room height** through SW.

Room Dimensions

Select unit (cm or inches).
 Room height: Enter the distance from floor to ceiling or to 1st obstruction.
 Distance from floor to the I.I.: Enter the minimum distance from floor to I.I.

Dimensional unit
☒ cm ☐ inch

Distances

Room height	<input type="text" value="300."/>	cm	250.0..500.0
Distance from floor to I.I.	<input type="text" value="4."/>	cm	4.0..40.0

Press Enter when done

Fig. 38: Room dimensions -2

- Confirm the entries with **OK**.
 - ⇒ A window is displayed with the old and the new values.
- Confirm with **OK**.
 - ⇒ The new time is now saved only in the unit!
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.

Checking the distance from floor to I. I.

- Move the unit into the 0° position.
- Position the unit in the center of the travel range and move it to the minimum table height.
- Measure the distance from the lowest point of the I. I. with I. I. collision protection cover to the floor ([Fig. 37 / p. 64](#)).

Required

1. $D \geq 4 \text{ cm}$
2. $D \geq 8 \text{ cm}$ (for systems with 33 cm I. I.)

Correction

- If the distance $D < 4 \text{ cm}/8 \text{ cm}$, record the difference to the desired value.
- Move the unit from the lowest position of the lifting base to the highest position.
- Increase the input value for **Distance from floor to I. I.** by the difference recorded.
- Check the distance by moving the unit into the lowest position of the lifting base again.
- Terminate the XCS SSW.
- Switch the system off and on again.

Checking the tabletop movement to ceiling height

- Position the tabletop approx. flush with the frame.
- Move the longitudinal carriage approx. in the center of the travel range.
- Position the unit completely upright (+90° and -90°).
- Move the tabletop out all the way in the longitudinal direction (in direction of ceiling).

Required

- Distance of tabletop to ceiling min. 5 cm

Correction

- If a distance A from the floor to the ceiling is lower than the min. value in the screen ([Fig. 38 / p. 65](#)), make a note of the difference.

- Decrease the entered value for the actual room height in the SSW window by the difference noted.
- Move the unit into the 0° position.
- Enter the actual room height under **Room height** (Fig. 38 / p. 65).
- Confirm the entry with **OK**.
 - ⇒ A window is displayed with the old and the new values.
- Confirm with **OK**.
 - ⇒ The new time is now saved only in the unit!
- Exit the service mode and switch the system off and back on to permanently save the value in the XCU.
- Check the tabletop movement to ceiling height again.

Checking the tabletop movement footward

- Position the tabletop approx. flush with frame.
- Move the longitudinal carriage approx. in the center of the travel range.
- Position the unit completely upright.
- Lower the tabletop all the way to the end position.
- Measure the distance from the floor to the lowest point of the tabletop.

Required

1. Distance from the floor approx. 34 cm (without footboard)
2. Distance from the floor at least 4 cm (with attached footboard)

Chapter 3: Link repaired in subchapter ([Prerequisites / p. 50](#)) [in first note]; Link repaired in subchapter ([Final check / p. 51](#)); Link repaired in subchapter ([Check / p. 59](#)) [in second bullet item]; Link repaired in subchapter ([Check / p. 45](#)); Link repaired in subchapter ([Prerequisites / p. 57](#)) [in first bullet item]